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Dear Reader,

A warm welcome to volume 4 of Issue 1 of the Uganda National Institute Public Health (UNIPH) Quarterly Epidemiological Bulletin.

This bulletin issue aims to inform different stakeholders including district, national, and global stakeholders on disease outbreak investigations, public health surveillance and interventions undertaken in detecting, preventing and responding to public health events in the country during the third quarter.

In this issue, we present reports on the investigation of the cholera outbreak in Kampala; Policy brief on reclassification of anthrax as a public good disease; Surveillance data analysis of mental health and neurological disorders among prisoners in Luzira prisons; Multiple Crimean Congo haemorrhagic fever outbreaks in Uganda; Policy brief on need for mandatory pet animals vaccination; Policy brief on need to develop mass behaviour change communication strategies for cost effective malaria prevention; and policy brief on increasing availability and provision of postpartum services both in the community and health facility level to reduce postpartum infections.

In case you would like to access original references used in this issue, feel free to contact us at: **euriend@musph.ac.ug,** lbulage@musph.ac.ug **OR** **mdaliddeki@musph.ac.ug**

We will appreciate any feedback regarding the content and general outlook of this issue and look forward to hearing from you. We hope this will be both an informative and enjoyable reading to you.

Thank You

Inside this issue:

THE UGANDA PUBLIC HEALTH FELLOWSHIP PROGRAM CONDUCTS THE THIRD GRADUATION CEREMONY
By Dativa Maria Aliddeki

The Uganda Public Health Fellowship Program graduated another cohort of Field Epidemiologists in January 2019, bringing the total number of FETP graduates to 30 since 2015. This was the third cohort of fellows trained in field epidemiology through an intensive 2-year in -service training. The eleven graduands were awarded in a colorful ceremony hosted at Golden Tulip Hotel, in Kampala, on 30 January, 2018. The ceremony was attended by the US Ambassador to Uganda, H.E Deborah Malac, Uganda Ministry of Health officials, the CDC Country Director and staff, the World Health Organization Country Representative, the Dean and staff of the Makerere University School of Public Health, USAID and District Health Officers.

During the ceremony, the graduands presented their achievements over the 2 years and used some of their projects to highlight evidence-based and policy-relevant recommendations for some of the public health challenges faced in Uganda. Projects under taken by fellows ranged from responses to public health emergencies, descriptive analyses of surveillance data on neglected tropical diseases, projects on HIV, and public health interventions aimed at improving quality of service delivery.

The certificate awarding ceremony was graced by Ambassador. Deborah Malac, who applauded Uganda for being at the forefront of building human resource capacity, which should be a priority of all resource constrained countries. She thanked the Makerere University School of Public Health for working with the Ministry of Health to ensure that this key workforce is absorbed into its service structures. This graduation was testament to Uganda has put to good use the support from the US government. She wished the graduands success in all their future deployments.

H.E Deborah Malac, WHO Country Representative, CDC Country Director, PHFP-secretariat, AFENET Executive Director, Ministry of Health officials and the Graduands after the ceremony

A NEW COHORT OF DISEASE DETECTIVES JOINS THE FELLOWSHIP PROGRAM
By Daniel Eurien

The Uganda Public Health Fellowship Program recruited the 5th cohort of Field Epidemiology fellows for 2019. The pioneer fellows were recruited in 2015; the program annually recruits fellows into the 2 year in-service training program. The new fellows are of mixed backgrounds, including Medicine, Pharmacy, Laboratory, and Nutrition. During their course of training, they will be disease detectives providing invaluable support to the different MoH departments. They have been attached to various priority host sites within MoH and related ministries. These sites include; Uganda National Expanded program for Immunization, National TB and Leprosy Program, Aids Control Program, Infectious Disease Institute. Other host sites are National Malaria Control Program, Non-Communicable Diseases Division, Vector Control Division, National Animal Disease Diagnositic and Epidemiology Center, and Reproductive health. Best wishes, disease detectives!

Upcoming Events

World Health Day: April 7, 2018

This is the global health awareness day, first observed on Apr 7, 1948. The aim of this day is to spread awareness on health and well-being. This year's theme is 'Universal Health Coverage: Everyone, everywhere'

World Malaria Day: April 25, 2018

The world commemorates this day as a sign of commitment made in 2007 (when the day was established) to rid the world of malaria. In Uganda, this day shall be commemorated in a yet-to-be-communicated venue. The theme this year is 'Ready to beat malaria!"

World No Tobacco Day: April 31, 2018

This day is observed annually to highlight health and other risks associated with tobacco use, and advocating for effective policies to reduce tobacco consumption. The focus of this year's WNTD is 'Tobacco and heart disease'.

The Field Epidemiology Training Program (FETP) International Night: April 28-May 02, 2019; Atlanta, GA, USA

This event is co-sponsored by TEPHINET and CDC. At this year's international night, PHFP will present the following abstracts: Outbreak of Cutaneous and Gastrointestinal Anthrax Associated with Handling and Eating Meat from an Infected Cow that Died of Anthrax: Kween District, Uganda, April 2018 by Esther Kisaakye

Malaria Outbreak Facilitated by Appearance of Vector-Breeding Sites after Heavy Rainfall and Inadequate Preventive Measures: Nwoya District, Uganda, March–May 2018 by Godfrey Nsereko

Policy Brief: Carrying of Home-Based Vaccination Records to Health Facilities for all Children below 5 years to Reduce Missed Opportunities for Vaccination

Dativa Maria Aliddeki[1]
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Executive Summary

Reducing Missed Opportunities for Vaccination requires health workers to screen all children below 5 years, reporting at health facilities, irrespective of the reason for visiting the health facilities. Screening for vaccination status is done basing on evidence provided by the Home-Based Vaccination Records (HBVRs). Currently, there is no policy guidance in Uganda on carrying of HBVRs by caregivers during every visit to health facilities. A policy enforcing carrying of HBVRs would enable health workers to screen for vaccination status and vaccinate all children that are not up to date with their vaccination schedule.

Introduction

Immunization ranks high among the most effective preventive measures against infectious diseases. In Uganda, the routine immunization schedule provides free vaccination for over 10 childhood illnesses. These vaccines are provided at specific intervals as guided by age of the recipient. A record of the vaccines received by the child is made in a Home-Based Vaccination Record (HBVR), which could be a Child Health Card (CHC) or Mother Child Passport (MCP)[1]. HBVRs are provided to caregivers either during the Antenatal Care (ANC) of the mother or at first contact of the child with immunization services, and are required at subsequent immunization sessions until a child is fully vaccinated, as per the Uganda vaccination schedule. This HBVR provides information on the vaccination status of a child, nutrition and growth monitoring, vitamin A supplementation and deworming status[2]. The HBVR can be used to; record health services received by the mother during ANC, at delivery and post-delivery, type of vaccine a child has received and the date for the next vaccination[3]. HBVRs are also known to be motivators for the caregiver to achieve the immunization milestones of the child[4]. Uganda has set routine immunization coverage targets of 90% at national level and 80% at district level. However, despite the availability of free vaccination services, routine immunization coverage for the various antigens has remained sub-optimal, which has led to failure to reach the required coverage for building the herd immunity necessary to prevent disease outbreaks. The low routine immunization coverage is attributed to a number of reasons, including Missed Opportunities for Vaccination (MOVs). An MOV is defined as any contact with health services by a child or an adult who is eligible for vaccination and with no contraindications, but which does not result in the individual receiving all the vaccine doses for which he or she is eligible[5].

Context and Importance of the Problem

A December 2018 UNEPI assessment of MOVs in 19 districts in Uganda found that, of all children below 2 years that had visited health facilities, 87% had an unknown vaccination status, because their HBVRs were unavailable for screening. Reducing MOVs requires health workers to screen all children reporting at health facilities, especially those below 5 years, identify those not up to date with their vaccination schedule and vaccinate them. Screening of these children is based on the information in the HBVRs, which provide documented evidence of the child's vaccination status. The compulsory carrying and screening of HBVR has been implemented since 2017 by Kangulumira H.C IV in Kayunga district. This practice has led to a reduction in MOVs and an overall increase in vaccination coverage at this facility, currently at **95%.** Similarly, caregivers reporting at this facility are now keen to ensure all children are vaccinated since it's a key requirement for receiving any other health related care for this child at the facility.

Critique of Policy Options

The World Health Organization (WHO) recommends that health workers use every opportunity to screen children below 2 years and ensure vaccination services are provided for those not fully vaccinated[5]. However, implementation of this recommendation requires caregivers to carry vaccination related HBVRs during every visit to a health facility, irrespective of the reason for this visit[6]. Currently, caregivers are encouraged to bring these HBVRs, especially during immunization sessions. However, there is no official policy that can be used as backup for health workers, to enforce the carrying of HBVRs and for this reason, caregivers do not prioritize these HBVRs when seeking health care for children, unless the required care is vaccination related. We seek to address this gap by ensuring that caregivers of children below five years of age always carry HBVRs when bringing children to seek any health care services, vaccination related or not.

Policy Recommendations

The MoH and health workers should enforce and ensure that all caregivers with children below five years of age carry with them HBVRs, during every visit to the health facility, irrespective of whether the reason of the visit is to seek vaccination services or not. Similarly, health workers must adopt HBVR screening as part and parcel of diagnosis and treating of children below 5 years.

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Cholera outbreak associated with drinking contaminated water from an open well-Kampala City, Uganda, January 2019.

Daniel Eurien[1*], Angella Musewa[1], Esther Kisakye[1], Francis Ongole[2], Benon Kwesiga[1], Daniel Kadobera[1], Alex Riolexus Ario[1]

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Summary: *On 6th January 2019, the Ministry of Health was notified by the District Surveillance Officer Lubaga Division, of a suspected cholera outbreak in Sembule village that had reportedly killed two people. We investigated to identify the source and mode of transmission of the outbreak, and recommend evidence-based interventions. We systematically identified cases by active search in the community and in three designated cholera treatment centers, conducted descriptive epidemiology and generated hypotheses. We conducted a case-control study in Sembule village, the epi-center of this outbreak in which we compared exposures during 28 December 2018 to 11 February 2019 among confirmed case-persons and asymptomatic controls, individually matched by age-group. We identified 50 case-patients, of which 22 were confirmed cases of V. cholerae O1, biotype El Tor serotype Inaba. The epidemic curve showed several point-source outbreaks following rains. Drinking water from open well W – naturally formed underground water puddles throughout the slums (OR $_{M-H}$=21, 95% CI: 4.6–93) was a significant exposure. Drinking water from public stand tap (OR $_{M-H}$ = 0.33, 95% CI: 0.13–0.86) and drinking boiled water (OR $_{M-H}$ =0.15, 95% CI: 0.04-0.60) were significantly protective. The village had a token-operated water tap, which had broken down one month prior to the outbreak, and residents resorted to drink water from open well. Environmental assessment showed that residents emptied their faeces into the drainage channel connecting the open well. Water from a container in one of 8 households tested positive for V. cholerae; water from open well C had coliform counts ≥900MPN/100ml. We concluded that this outbreak was caused by drinking contaminated open well water. We recommended emergency chlorination of drinking water, fixing the broken public tap, closure of open well C, sensitization about the danger of drinking water from open well C, and improving latrines so they are not discharged into the drainage channel.*

Introduction: Cholera is a communicable disease with a short incubation period of a few hours to 5 days and has a high epidemic potential. It is a bacterial infection caused by *Vibrio Cholerea* and is mainly transmitted through consumption of food, or water contaminated with the bacteria (1). It commonly presents with profuse painless watery diarrhea, and vomiting (1). When untreated, about 5% of the case-persons die of severe dehydration.

Uganda is among the 51 cholera endemic countries. Cholera endemic countries are classified as those reporting confirmed cholera cases detected during the last 3 years with evidence of local transmission (1). Kampala city is among the three endemic cholera regions in Uganda, the other two being the western border districts with the Democratic Republic of Congo (DRC), and Karamoja region to the north east (2). Kampala city, like most cities in developing countries, is experiencing rapid urbanization leading to an increase in population, and rapid development of peri-urban (informal) settlements. More than 60% of the city's population with low incomes resides in these settlements which have the lowest basic service levels (sanitation, water supply, solid waste collection, and storm water disposal) hence increased risk for hygiene related diseases including cholera (3) ,(4).

On 6th January 2019, the District Surveillance Officer Lubaga division in Kampala called the Emergency Operation Center at the Ministry of Health regarding a suspected cholera outbreak in his division. We investigated to estimate the scope of the outbreak, identify the mode of transmission, and recommend evidence-based control measures.

Methods: We defined a suspected case as onset of profuse, painless acute watery diarrhea in a Kampala City resident (≥2 years) from 28 December 2018 to 11 February 2019. A confirmed case was a suspected case with *Vibrio cholera* identified from the patient's stool specimen by culture or Polymerase Chain Reaction (PCR). We found cases by record review and active community case finding. We conducted a case-control study in Sembule village, the epicenter for this outbreak to compare exposures among confirmed case-persons and asymptomatic controls, matched by age-group. We also conducted an environmental assessment. We tested water samples from randomly selected households and water sources for total coliforms using the Most Probable Number (MPN) and PCR to identify the organism.

Results: We identified 50 case-patients, of which 22 were confirmed cases of *V. cholerae* O1, biotype El Tor serotype *Inaba*, and 3 died (Case fatality rate=6%). Cases presented with watery diarrhea (100%), vomiting (68%), abdominal pain (12%), and fever (5.8%). The epidemic curve showed several point-source outbreaks following rains. All age-groups were affected; age-group 5–14 was the most affected (AR: 8.2/100,000). All the five divisions were affected. Lubaga Division was most affected (attack rate [AR]: 6.5/100,000), all cases were from Sembule village. Affected households from Sembule village drank water from open wells after their stand pipe tap broke down in December 2018. In the case-control investigation, 83% (15/18) of case-persons compared to 18% (16/90) of control-persons drank water from well X(OR $_{M-H}$=21, 95% CI: 4.6–93) (Figure 1). However, 28% (5/18) of case-persons compared with 69% (62/90) of control persons drank water from a public stand tap (OR $_{M-H}$ = 0.33, 95% CI: 0.13–0.86); 33 % (6/18) of case-persons compared with 66% (59/90) of control persons drank boiled water (OR $_{M-H}$ =0.15, 95% CI: 0.04-0.60). The village had a token-operated water tap, which had broken down one month prior to the outbreak, and residents resorted to drink water from open well X. Environmental assessment showed that residents emptied their faeces into the drainage channel connecting the Open well X. Water from a container in one of 8 households tested positive for *V. cholerae*; water from open well X had coliform counts >900MPN/100ml.

Figure 1: Distribution of symptom onset dates of cholera cases: Kampala City, Uganda, December to January 2019

Meteorological data showed that heavy rainfall preceded peaks of the cholera outbreak. Despite implementation of interventions including community awareness campaigns

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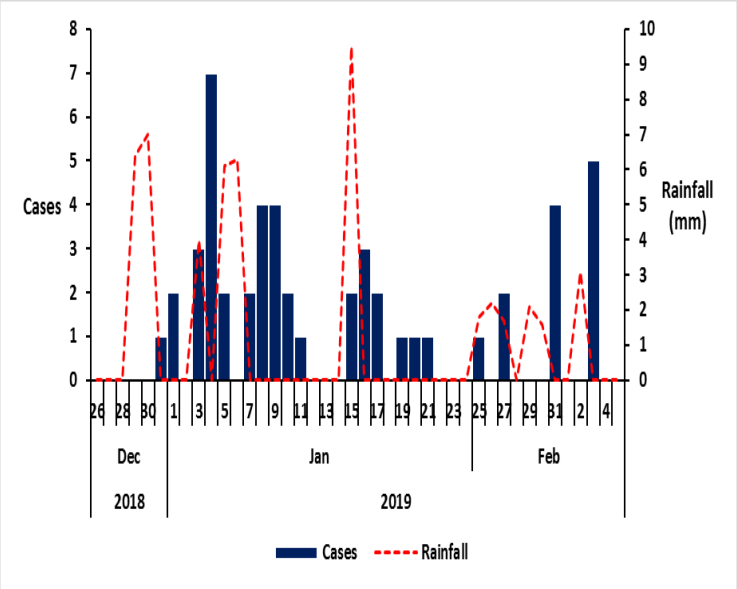

and distribution of chlorine to households, the number of cases continued after subsequent rainfall. There were no new cases following stoppage of community members from using the implicated well water.

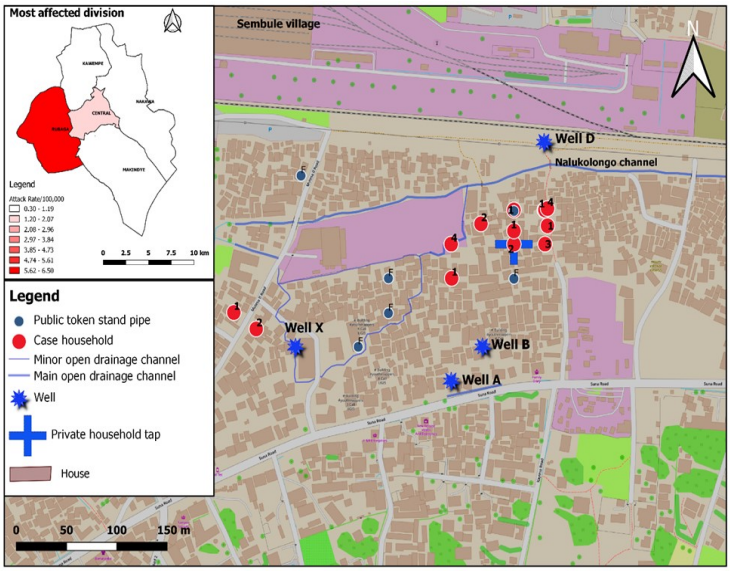

Figure 2: Map showing location of households affected by cholera in Sembule village. Inset map shows the affected divisions in Kampala, January 2019

All the five divisions were affected (inset map), with Rubaga Division being the most affected (AR: 6.5/100,000) followed by Central Division (AR: 2.1/100,000). All the affected case-persons in Rubaga Division were in Sembule village where the first cases were reported (Figure 2).

Discussion: Our investigation revealed that the cholera outbreak in Sembule village was caused by drinking well water contaminated by flooding from open drainage channels after rainfall. Prior to this outbreak, there was reported unconfirmed cholera outbreak in the neighboring Katwe village. Therefore, cholera might have been introduced into Sembule village by one or multiple visitors carrying the bacteria, causing the initial infections. The initial case-patients also likely released feces from their pit latrines onto the drainage channel, a practice common in slum areas where latrines are emptied into open drainages during heavy rains. Heavy rainfall subsequently washed the case-patients' feces released from latrines onto drainage channels that flooded the wells, consequently contaminating the water. Residents collected the contaminated well water after the flood receded and drank it without boiling or treating it, causing the outbreak.

Globally, poor water and sanitation conditions have been implicated in several waterborne disease outbreaks including typhoid and cholera (7, 8). Cities in Sub-Saharan Africa particularly at a high risk because many have registered high population growth rates in recent years, without corresponding increase in access to improved water and sanitation facilities (9, 10). Consequently, outbreaks of waterborne diseases including cholera occur frequently and mostly precipitated by rains (11,12). In Uganda, cholera outbreaks in the capital Kampala mostly occur in slum dwellings usually characterized by overcrowding with insufficient clean water and poor sanitation facilities (13). Investigations of cholera outbreaks in different parts of Uganda revealed that the outbreaks were caused by drinking contaminated untreated water (14). Contamination usually results from poor planning and inadequate enforcement of the Public Health Act in slum areas. Many cholera outbreaks in Uganda have not been investigated epidemiologically, and most times die out after the implementation of general interventions (15). The inability to investigate all past cholera outbreaks presented a missed opportunities to generate specific-evidence based interventions that could have helped prevent subsequent outbreaks. Our investigation was able to provide actionable evidence on the ways well water was contaminated following release of fecal matter from latrines after rains. We were also able to demonstrate the safety of the public piped water system. This information informed Kampala Capital City Authority and National Water and Sewerage Corporation to implement immediate interventions to stop the outbreak and long-term interventions to prevent future outbreaks of cholera and other water-borne diseases.

The main limitation of our study was the inability to link the possible source of the initial contamination to the outbreak.

Conclusions and recommendations: This outbreak was caused by drinking contaminated open well water. We recommended emergency chlorination of drinking water, fixing the broken public tap, closure of open well X, sensitization about the danger of drinking water from open well, and improving latrines so they are not discharged into the drainage channel.

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Reclassify anthrax from a private to public good disease

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Summary

Currently, anthrax is classified as a "private good disease" which means that the management and control of anthrax in Uganda is done by farmers. Unlike other diseases like foot and mouth disease, Contagious bovine pleuropneumonia (CBPP) and Rabies which are state controlled diseases, anthrax is not. The control of anthrax is still a challenge which has resulted into several anthrax outbreaks in both animals and humans all over the country in districts such as Kween, Kiruhura, Isingiro, and Arua in 2017 & 2018 (1) .

Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) through the National Animal Disease Diagnostics and Epidemiology Centre (NADDEC) is responsible for policy development, management and guidance on animal disease diagnosis, vaccine development, epidemiology/surveillance and control. Much as this mandate stretches over a number of animal diseases, management and control are limited to a few public good diseases leaving majority including anthrax entirely to the private sector.

Reclassifying anthrax as a public good disease will ensure state control and management of anthrax thus reducing on the frequency of outbreaks reported among animals and humans across the country. In addition, meat and milk production will increase due to improved management of livestock as a result of anthrax reclassification. Thus, the main objective of this policy brief is to high light the relevance of reclassifying anthrax as a public good disease which is paramount in the prevention and control of future anthrax outbreaks in Uganda.

Context and importance of the problem

Anthrax is a bacterial zoonotic infection which is of great public health concern and a global health security issue (2). It is caused by *Bacillus anthracis* (*B.anthracis*) and transmitted to humans through contact with animals and their products such as milk, meat, skins and hides (3).

Its spread is facilitated by natural calamities such as seasonal drought which drives both domestic and wild animals to graze communally. In addition, seasonal floods carry the spores and natural fauna from one settlement to the other. Once anthrax is in domestic animals, then the likelihood of crossing over to humans is very high through consumption of contaminated meat, inhaling spores and handling infected carcasses with bare hands among others.

Over 80% of Uganda's population is engaged in agriculture with 58% of these individuals involved in livestock farming (4). Uganda has an estimated 14.3 million cattle, 15.7 million goats, 4.3 million sheep, and 4 million pigs, which generates a lot of revenue to the government and income to the farmers. The population heavy engagement in agriculture indicates increased interaction between livestock and humans which is a ground for transmission of anthrax. Additionally, farmers in rural areas have encroached on game parks/reserves thus further increasing the interaction between livestock, wildlife, and humans

Uganda is vulnerable to zoonotic diseases due to its unique biological diversity, and population increase which is associated with encroachment of game parks and reserves which facilitates close contact between humans and animals (domestic and wild) across the country(4).

The Ministry of Agriculture, Animal Industry and Fisheries division of epidemiology designed a surveillance system for anthrax in 1994. Standard pre-tested data collection tools were designed by the ministry on which district veterinarian officers were trained to capture information on anthrax cases. The tool was sent to all districts to use for routine surveillance from each district regarding anthrax which is sent electronically to the epidemiology centre (MAAIF) together with any accompanying samples (blood or tissue). On a monthly basis, suspected anthrax alerts are reported per district including animal deaths and human cases. In addition, the Uganda Wildlife Authority has a reporting system where suspected animal deaths as a result of anthrax infection are reported.

Through the surveillance system, it has been documented that cattle corridor districts and their surroundings have been reporting anthrax outbreaks since 1969 in Uganda(5). Several wild animals including buffalos, warthogs, Zebras among others died due to anthrax in Queen Elizabeth National Park, Lake Mburo National in the past decade(6). This hampered income generation from the tourism activities that take place in those national parks. More recently, anthrax outbreaks have been reported in Arua, Kween and Kiruhura Districts which resulted in 186 suspected human cases and 236 livestock deaths (1). To note, there are new anthrax cases which are reported through the "6767" electronic messages from the Emergency Operations Centre (MOH) with the most recent case reported in February 2018. Indeed, human cases of anthrax have continued to be reported, indicating ongoing outbreaks in several districts such as Isingiro, and Mbarara(1). The frequent occurrence of an-

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thrax outbreaks in Uganda requires an urgent policy response to deal with the prevention, management, and control of anthrax spearheaded by government to avoid future outbreaks which are associated with heavy loses of both humans and animals. The revised policy should include routine vaccination of anthrax catered for by the government, providing refresher training to community health animal workers to ensure prompt detection of suspect anthrax cases in affected areas.

Critique of policy options

In developed countries such as USA, Canada, Australia, and some parts of Asia, anthrax management is being done by state. This is due to the fact that anthrax is a potential weapon for bioterrorism. So many decades ago, several anthrax outbreaks were reported in the USA including inhalational anthrax among humans which resulted into several deaths. The frequent anthrax outbreaks resulted into a massive surge in critical analyses of detection, diagnostic, epidemiological, decontamination, treatment and prophylaxis procedures for anthrax done by the state due to the nature of the disease and thus a reduction of the number of outbreaks reported(7).

Due to state management of anthrax in developed countries, national programmes such as mass animal vaccination resulted in a global reduction of anthrax (2). However, in Sub Saharan Africa, the disease still remains a major public health problem where outbreaks continue to occur due to poor management of anthrax. This is explained by the fact that the prevention, management and control of anthrax is the responsibility of the farmer which makes it difficult to manage the disease. Farmers have to buy the vaccines and drugs to treat exposed animals or call on private veterinary practitioners to treat their animals which is expensive for most of them. In addition, during anthrax outbreaks, safe carcass disposal is not affordable to many farmers hence leaving carcasses open on the ground which increases the risk for infection to healthy animals and humans. Infection prevention and control during outbreaks is also hard to be maintained by farmers due to practices such as communal grazing which are prevalent in most rural districts. As a result, one animal death can result into a big outbreak.

Management of anthrax requires embracing the One Health approach which will bring different disciplines together from human health, animal health, and wildlife if the disease is to be reclassified as a public good disease. In order to control future anthrax outbreaks in Uganda, it is important that the state takes full responsibility of investigation, detection, vaccination of animals, and health education of communities on dangers of anthrax.

Policy Recommendation

In order to prevent future anthrax outbreaks in the country, reclassifying anthrax as a public good disease will assist in collective actions using the one health approach by all responsible bodies including ministries of; Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Ministry of Health and authorities like Uganda Wildlife Authority, and Uganda's National One Health Platform, and Zoonotic Disease Coordination Office for control and management of anthrax in Uganda.

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Mental and neurological disorders among prisoners who sought care at Murchison Bay prison Hospital in Uganda, 2015 - 2017

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Summary

In Uganda, mental illness affects over 30% of the population and fewer than 50% of these individuals seek intervention due to limited access to mental health services. Mental health problems and disorders are more prevalent in prisons than outside. This retrospective cross-sectional study utilizing secondary data aimed at establishing the trends and distribution of mental Illnesses among prisoners in Uganda (2015-2017) to support plans to improve mental health services among prisoners in Uganda. There was an increase in incidence among prisoners at Murchison Bay Hospital between July 2016 to December 2017(HIV Related Psychosis (13/1000 to 56/1000), Schizophrenia (0.24/1000 to 10.2/1000) and Epilepsy (1.7/1000 to 18/1000). 2015 (Females =150/1000, Males =81/1000), 2016 (Females =119/1000, Males =20/1000), 2017 (Females=1.6, Males =56/1000) and Depression; The biannual percentage change in incidence every six months was: Schizophrenia (OR=1.8, 95% CI=1.7-1.9), Depression (OR=1.2, 95% CI=1.1-1.3), HIV Related Psychosis (OR=1.1, 95% CI=1.1-1.2), Bipolar disorders (OR=0.7, 95% CI=0.64-0.76), Dementia (OR=0.85, 95% CI=0.79-0.91). Mental illnesses among prisoners is on the increase especially HIV related psychosis, Schizophrenia, Epilepsy and Depression. Women prisons should receive extra resources to support their mental health services.

Background

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Mental illnesses are disorders that affect the mood, thinking and behavior of a person. These include depression, anxiety disorders, schizophrenia, eating disorders, dementia, epilepsy, HIV related psychosis, bipolar disorders and addictive behaviors such as alcohol and drug abuse, etc.

It is estimated that the global burden of mental illness is 32·4% of years lived with disability (YLDs) and 13·0% of disability-adjusted life-years (DALYs). In 2013, mental illness accounted for 21·2% of global years lived with disability (YLDs) which is 3·5 times greater than that associated with all infectious diseases (6·0% of YLDs), 4 times greater than that for all injuries combined (5·0% of YLDs), 8 times greater than that associated with all cardiovascular and circulatory diseases (2·8% of YLDs), and 24 times greater than that associated with all cancers (0·9% of YLDs). Five types of mental illness appear in the top 20 causes of global burden of disease (GBD): major depression (2nd), anxiety disorders (7th), schizophrenia (11th), dysthymia (16th), and bipolar disorder (17th) were leading causes of years lived with disability (YLDs) (1). This study sought to determine the trends of Mental Illnesses among prisoners in Uganda, 2015 -2017 and describe the distribution of Mental Illnesses by sub population groups among prisoners in Uganda, 2015 -2017

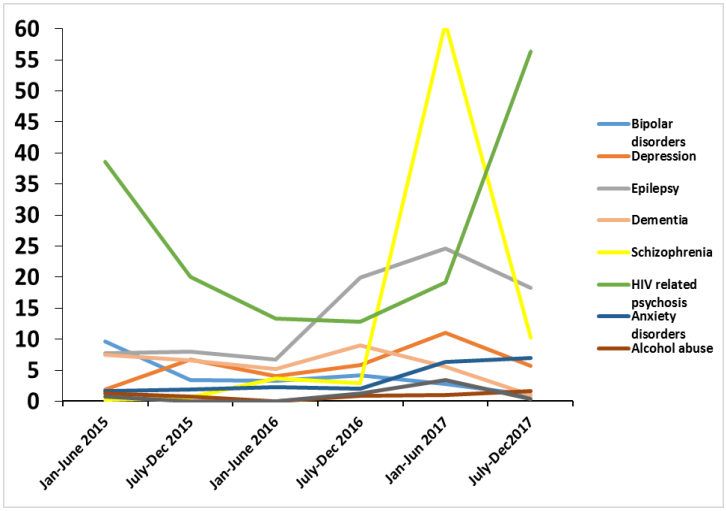
Methods

Luzira Maximum prison is the largest prison in Uganda and was purposively selected for this study. The prison is in the Luzira parish, Nakawa Division in southeastern Kampala, the capital city of Uganda. It is also the only prison where a hospital-Murchison Bay Hospital is located. Murchison Bay Hospital is a National Prison Referral Hospital and thus receives patients referred from prison health facilities across the country. In addition, there are lower level healthcare facilities within Luzira prison such as the staff and upper prison clinics. We extracted data on all prisoners who were reported with mental illness and neurological disorders in DHIS2 by Murchison Bay Hospital for a period 2015 – 2017. Data from Murchison Bay prison Hospital is compiled using routine HMIS tools and reported electronically to Uganda MoH. The annual prison population data was used to identify bi-annual trends of mental illnesses by period, type, and person. We sought permission for using the data from Uganda Prisons Service and the MoH that own the HMIS data.

RESULTS

From July 2016 to December 2017, there was a noticeable increase in incidence of HIV Related Psychosis among prisoners managed at Murchison Bay Hospital (Jul-Dec 2016 = 13/1000 and Jul-Dec 2017 = 56/1000). During January to July 2017, there was a sharp increase in Incidence of Schizophrenia among prisoners (61/1000). In addition, there was an increase in Epilepsy among prisoners from 7.7/1000 in Jan-Jun 2015 to 18/1000 during Jul-Dec 2017. The incidence in dementia among prisoners decreased from 7.5/1000 during Jan-Jun 2015 to 0.96/1000 in Jul-Dec 2017. (Figure 1).

Figure 1: Trends of Mental Illnesses among prisoners at Murchison Bay Hospital, Uganda, 2015-2017



For all years, HIV related psychosis was high in both sexes: 2015 (Females =150/1000, Males =81/1000), 2016 (Females =119/1000, Males =20/1000), 2017 (Females=1.6/1000, Males =56/1000). In 2015 and 2016, the incidence of dementia was high among women prisoners compared to that among male prisoners: 2015(Females=36/1000, Males=5.2/1000) and 2016 (Females=90/1000, Males=9.1/1000). Depression was high among female prisoners compared to male prisoners for all the years: 2015(Females = 49/1000, Males=16/1000), 2016 (Females=70, Males = 8.5), 2017 (Females=70, Males=3.3). (Figure 2).

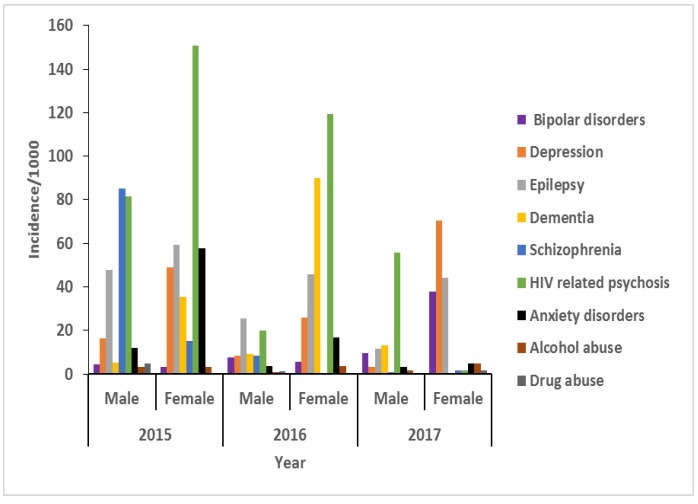


Figure 2: Distribution of Mental Illnesses by sex among prisoners at Murchison Bay Hospital, Uganda, 2015 -2017

Bi-annual change in incidence of Mental Illnesses among prisoners at Murchison Bay Hospital, Uganda, 2015 -2017

Over the entire study period, we identified 4053 mental illness cases. The average increase in incidence over the three

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years was 461/1000 prisoners. For every additional six months from 2015-2017, the biannual percentage change in incidence was: Schizophrenia (OR=1.8, 95% CI=1.7-1.9), Anxiety Disorders (OR=1.4, 95% CI=1.3-1.5), Epilepsy (OR=1.3, 95% CI=1.2-1.3), Depression (OR=1.2, 95% CI=1.1-1.3), HIV Related Psychosis (OR=1.1, 95% CI=1.1-1.2), Bipolar disorders (OR=0.7, 95% CI=0.64-0.76), Dementia (OR=0.85, 95% CI=0.79-0.91).

Disorder	Start Incidence (Jan-June 2015)	End incidence (July-Dec 2017)	Absolute difference	Biannual % change in incidenc	OR(95% CI)
Schizophrenia	0.24	10	9.8	81	1.8(1.7-1.9)
Anxiety disorders	1.6	6.9	5.3	41	1.4(1.3-1.5)
Epilepsy	7.7	18	10.3	28	1.3(1.2-1.3)
Depression	1.9	5.7	3.8	18	1.2(1.1-1.3)
HIV psychosis	39	56	18	11	1.1(1.1-1.2)
Bipolar disorders	9.6	0.96	-8.6	30	0.70(0.64-0.76)
Dementia	7.5	0.96	-6.5	15	0.85(0.79-0.91)

Discussion

Mental illnesses among prisoners was on the increase especially HIV related psychosis, Schizophrenia, Epilepsy, and Depression. Female prisoners were affected more than males. Although there is on entry screening of all prisoners' health conditions in all Uganda Prisons, mental health services are only provided in selected prisons health facilities.

During a systematic review by Fazel and Danesh, 2002, prisoners were several times more likely to have psychosis and major depression, and about ten times more likely to have antisocial personality disorder, than the general population. Yet still, Post Traumatic Stress Disorder (PTSD) prevalence among prisoners was 35% compared to prison staff at 15% in Uganda Prisons service (6, 9).

Conclusions

Mental illnesses among prisoners is on the increase especially HIV related psychosis, Schizophrenia, Epilepsy and Depression. Female prisoners are affected more than males. Our study confirms a disproportionate burden of mental illness problem among prisoners. Further studies should be conducted to establish the cause of the high burden of mental illnesses among prisoners with focus on female prisoners.

Recommendations

The Uganda Prisons Service should enhance mental illness related health services in all prison facilities. HIV programming activities in Uganda Prisons Service should give more attention to Psychotic HIV patients to reduce on double jeopardy. Women prisons should receive extra resources to support their mental health services.

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Multiple sporadic Crimean-Congo Haemorrhagic Fever Outbreaks, Uganda, July 2018-January 2019

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Summary

In 2018, the Ministry of Health confirmed multiple sporadic CCHF outbreaks between July 2018 and January 2019. The sporadic outbreaks affected 11 districts. We conducted investigations to determine the scope of these outbreaks, identify risk factors for evidence-based interventions. We identified 14 case-patients from 11 districts located in Western and Central Uganda. The case fatality was 36% (5/14). The males (AR 4.4/1,000,000) were more affected than females (AR/1,000,000). 71% (10/14) of the case-patients had found ticks attached to their bodies compared to 27% (15/56) of the control-persons (AOR 9.3, 95%CI 1.9-46). The CCHF outbreak was associated to tick exposure. We recommend strengthening of tick control strategies and regulation of animal movements to reduce the dispersal of the infection.

Background

Crimean-Congo Haemorrhagic Fever (CCHF) is a zoonotic viral haemorrhagic fever caused by a tick-borne virus. The primary form of transmission of the virus between animals and humans is through ticks though contact with infectious blood or body fluids can lead to infection [1]. The incubation period for CCHF is 1-9 days following a tick bite and 5-13 days through contact with infectious blood or body flu-

Uganda has had 9 CCHF confirmed outbreaks since 2013. The disease occurred and was detected more in 2018 compared to previous years. The first confirmed outbreak was in 2013 in Agago District with 3 cases, 2013 Wakiso (2 cases), 2015 Nakaseke (1 case), 2017 Kiboga (1 case), 2017 Nakaseke (1 Case), and 2017 Luweero (1 case) and early 2018, outbreaks were confirmed in Nakaseke and Mubende districts.

In July 2018, Uganda Virus Research Institute (UVRI) confirmed 2 CCHF case-patients by PCR. Subsequently for 7 months, suspected CCHF case-patients were sporadically reported and confirmed by PCR. We conducted investigations to determine the scope of these outbreaks, and identify risk factors for evidence-based interventions.

Methods

We defined a suspected CCHF case as sudden onset of fever (>38° C) with any four of the following symptoms; loss of appetite, vomiting, diarrhoea, headache, abdominal pain, joint pain and sudden onset of unexplained bleeding in a resident in Isingiro, Kiryandongo, Luweero, Mukono, Nakaseke, Rakai, Ibanda, Kabarole, Rukungiri, Masindi, and Kiruhura districts from 1 July 2018 – 30 January 2019. We defined a confirmed case as suspected case positive for CCHF by Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) assay or Immunoglobulin (IgM) serology.

We used the UVRI surveillance data to identify case-patients coupled with review of hospital records. We described case-persons by: person, place, time, and symptom characteristics. We interviewed 8 cases and generated a hypothesis that we tested in a case-control study. We hypothesized that case-patients were associated with presence of tick-infested animals in their household or neighbourhood. Using all case-patients; each compared to 4 control-persons matched by age, sex, and village, we tested the hypothesis through interviews guided by a structured questionnaire.

Findings

Descriptive epidemiology and case-control study findings

Fourteen confirmed case-patients were line listed between July 2018 and January 2019 from 11 districts, of which 5 died (case fatality rate=36% (5/14) The mean age of case-patients was 24 (SD±9). Most case-patients were aged between 19-35 years of age. 93% (13/14) of the case patients experienced bleeding and fever (Figure 2). Of the case-patients, 64% (9/14) were males whereas 36% (5/14) were females. Males (AR 4.4/1,000,000) were more affected by females (AR 2.4/1000000). The case-patients lived in Isingiro (2), Mukono (1), Nakaseke (2), Kiryandongo (2), Luweero (1), Rakai (1), Ibanda (1), Kabarole (1), Rukungiri (1), Masindi (1) and Kiruhura (1), all located in Central and Western Uganda. Most of the districts (73%) affected have a high cattle population (>140,000 cattle) according to the 2010 animal census (Figure 1). Nakaseke District was the most affected district (AR 10/1000000) where as Mukono District was the least affected (AR 1.7/1,000,000). Ngoma sub-county in Nakaseke District was the most affected (AR 255/1,000,000) where as Ibanda Town council was the least affected (10/1,000,000) (Table 1).

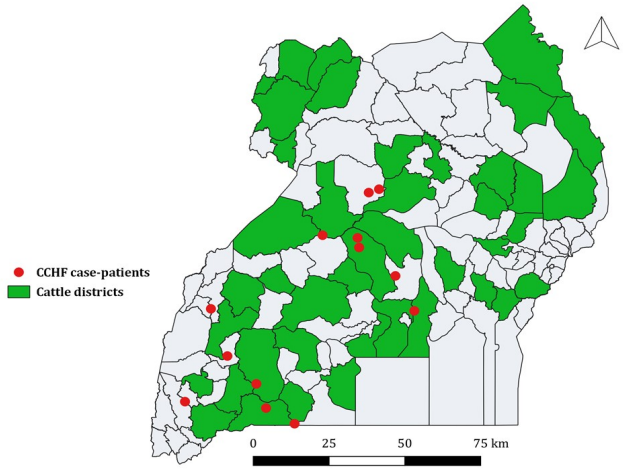

Figure 1: Location of CCHF case patients highlighting districts with cattle populations >140,000

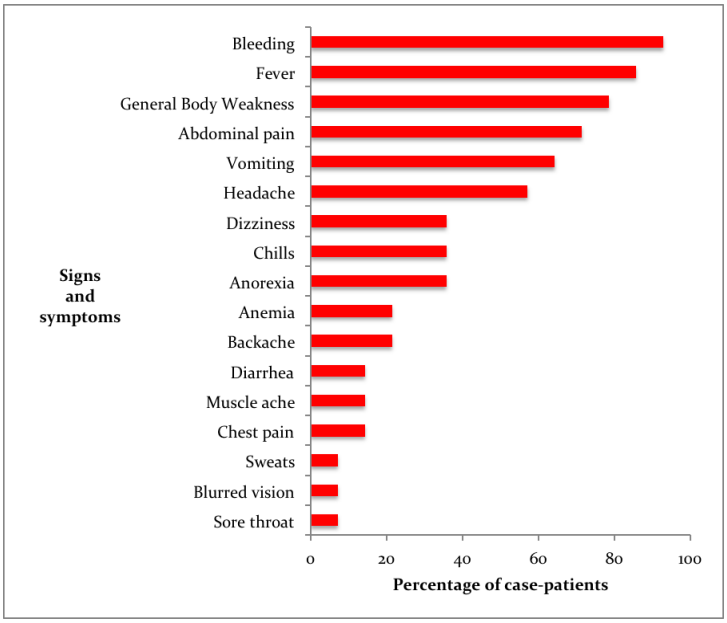

Figure 2: Signs and symptoms experienced by case-patients during the CCHF outbreaks

Table 1: Attack rates per sub-county

District	Sub-county	Population	Frequency	Attack rate/1000 000
Nakaseke	Ngoma	7,853	2	255
Kiruhura	Sanga	7,029	1	142
Rukungiri	Buhunga	22,088	1	45
Kabarole	Kasenda	24,090	1	42
Rakai	Kibanda	24,559	1	41
Isingiro	Nakivaale	55,870	2	36
Luweero	Town Council	42,869	1	23
Masindi	Bwijanga	52,084	1	19
Kiryandongo	Mutunda	63,186	1	16
Mukono	Goma	93,039	1	11
Ibanda	Ibanda Town Council	104,805	1	10

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In terms of risk factors, 71% of the case-patients had found ticks attached to their bodies compared to 27% of the control-persons (AOR 9.3, 95%CI 1.9-46).

Discussion

Our study found case-patients had higher odds of having tick exposure than control-persons. This was similar to prior studies carried out during CCHF outbreaks in Uganda that linked case-patients to tick exposure. In 2017, Kizito et al found case-patients had higher odds of having had tick exposure (OR 11, 95%CI 1.1-112) [3] than control-persons. Additionally, Balinandi et al had linked the isolated CCHF case-patient in 2015 to tick exposure after isolating CCHFv RNA by RT-PCR from one of the tick samples picked from animals proximal to the case-patient [4].

CCHF outbreaks in Uganda are on a rise. From 2013, less than 10 outbreaks have been confirmed however we observe 13 sporadic outbreaks occurring within 7 months between 2018 and 2019. We could relate this observation to the VHF surveillance program that has effectively detected VHF outbreaks robustly [5]. Alternatively, it could be due to the increase in the suspicion index of health workers due to the Ebola outbreak in Democratic Republic of Congo (DRC) hence increased surveillance [6]. However, widespread tick resistance that is burdening this country could also be linked to rise in occurrence of these outbreaks.

No definitive preventive and control strategies have been widely implemented successful due to little understanding of the pathogenesis of the disease [1]. Antibodies in livestock are the best indicator of risk of CCHF in humans. Such serological studies have not been adequately explored in Uganda thus risk in humans has not been fully assessed. However, ticks being the known vectors transmitting the disease, tick control is paramount in preventing and controlling future outbreaks.

Limitations

Due to logistical limitations, we were unable to confirm presence of infected animals around the case-patients. At the time of the investigation, there was an ongoing Ebola outbreak in the DRC that resulted in an overwhelming number of suspected EVD samples at the UVRI VHF laboratory. We were therefore unable to test animal and tick samples collected during the investigation due to shift of priority towards intensified Ebola screening.

Conclusions and recommendations

The CCHF outbreaks were sporadic with 14 confirmed case-patients from 11 districts within 7 months period. The outbreaks were associated to tick exposure. Animal movements might have led to the dispersion of the outbreaks. We recommend that Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) should strengthen tick control strategies and regulate animal movements to reduce the dispersal of the infection.

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Develop Mass Behavioral Change Communication Messages on Cost Effective Integrated Malaria Prevention Methods

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Executive summary

Malaria is the leading cause of morbidity and mortality in Uganda, accounting for up to 12 million confirmed cases and 14,400 deaths in 2017 alone. Despite huge investments for prevention and control, Uganda is still far from malaria elimination. A malaria outbreak investigation in Nwoya district in 2018 revealed that using integrated malaria prevention methods was associated with reduced malaria transmission and illness. Therefore, developing behavior change communication messages sensitizing masses to close windows and doors early in the evenings and to clear all stagnant water around homesteads will enhance malaria elimination efforts.

Introduction

Malaria is the leading cause of morbidity and mortality in Uganda, accounting for up to 12 million confirmed cases and 14,400 deaths in 2017 alone, and total investment for malaria prevention and control strategies at $93.9 million[1]. The whole population is at risk of malaria all year round. To counter the burden of malaria, the Government of Uganda through the Ministry of Health

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(MoH) has emphasized both prevention, through sleeping under insecticide-treated bed nets as Long Lasting Insecticide Treated Nets (LLINs), and seeking testing and treating services promptly[2] as the main behavioral change messages to the public.

Despite the heavy investments and implementation of prevention strategies by National Malaria Control Division (NMCD) of MoH and partners, Uganda is still far from malaria elimination. The limited gains in malaria control call for advocacy of other cost-effective behavioral change messages on integrated malaria prevention approaches to supplement the existing strategies. Methods promoted in the integrated approach include: screening in windows, ventilators and eaves; closing of windows and doors early in the evenings; removing mosquito breeding sites such as stagnant water; and use of LLINs[3].

Context and Importance of the problem

A recent investigation into an outbreak of malaria in malaria-endemic Nwoya District in March to May 2018 revealed that applying of integrated malaria prevention methods was associated with reduced malaria transmission and illness. In the analytical case-control study, 55% of case-patients and 18% of controls had stagnant water around households for several days following rainfall (OR_{M-H}=5.6, 95%CI=3.0-11); 25% of case-patients and 51% of controls wore long-sleeve cloths during evening hours (OR_{M-H}=0.30, 95%CI=0.20-0.60); 29% of case-patients and 15% of controls did not sleep under a long-lasting insecticide-treated net (LLIN) (OR_{M-H}=2.3, 95%CI=1.1-4.9).

Critique of Policy Options

The World Health Organization (WHO) recommends use of integrated vector management for malaria control[4] and case management, which has shown promise in contributing to reducing the burden of the disease[5]. Other malaria prevention methods such as screening in ventilators (openings on houses that allow in fresh air) and draining stagnant pools of water have led to reduction of mosquito populations near homes, limited their entry into houses, and therefore prevented bites from the malaria vector.

Policy recommendations

Behavior change communication messages targeted for the general public should encompass cost-effective and easy to apply methods that can contribute to reduction of malaria transmission. The NMCD of MoH, through the Department of Health Information of MoH, should come up with messages sensitizing masses to close windows and doors early in the evenings; wearing long sleeve clothes to prevent fast contact with mosquitoes; and clearing all stagnant water and removing empty vessels around homesteads.

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Policy Brief

Adopt compulsory vaccination of pets against rabies to prevent human rabies

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Executive summary

Rabies is a fatal viral and vaccine preventable zoonotic disease that can infect all mammals. Despite being a vaccine preventable disease, the 8240 rampant animal bites (proxy to rabies) in Uganda since 2013-2017 led to the deaths of at least 156 humans associated with rabies. Available evidence reveals that vaccination is one of the most successful global health interventions and cost-effective ways to save lives in humans and animals and prevent diseases such as rabies. Thus, there is an urgent need to review the rabies act of 1945 to include compulsory vaccination of pets against rabies to control rabies in animals and hence prevent spillage to in humans.

Context and importance of the problem

Rabies is a fatal viral and vaccine preventable zoonotic disease, that can infect all mammals (1–3). Worldwide, canine rabies causes at least 59,000 human deaths and 8.6 billion USD (95% CIs: 2.9-21.5 billion) economic losses annually (3). Rabies is transmitted majorly through the bite followed by licks or scratches of an infected rabid animal or through transplantation of tissues or organs from an infected individual (4–6). Most of the animal bites leading to human rabies cases are due to bites from infected dogs (7). In dogs, the incubation period of rabies is 3-8 weeks (8). Other findings indicated that the incubation period of rabies in dogs was 10 days to 6 months, with most cases manifesting signs between 2 weeks to 3 months (9). A review of rabies surveillance data from 2013 to 2017 revealed that 8240 animal bites (proxy to rabies) in Uganda led to the deaths of at least 156 humans associated with rabies. This alarming number of animal bites usually forces governments to purchase and stock supplementary anti-rabies vaccines for prevention and treatment of the bite victims and its relat-

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ed conditions (10). However, the challenge here is lack of adequate anti-rabies vaccines to conduct vaccination in pets. Even if the vaccines were enough, the other challenge would be ensuring that pet owners comply with vaccination of their pets against rabies.

Thus, though other findings indicated that the cost-effective method of controlling rabies is to prioritize canine vaccination rather than continued expansion of PEP in humans (7). Operationalizing canine vaccination would require that we review how vaccination of pets would be conducted in Uganda to ensure efficiency and effectiveness.

Critique of policy options

In developed countries, the mass anti-rabies canine vaccination coupled with oral vaccination in wildlife have greatly contributed to the elimination of rabies in canines and consequently a reduction in human rabies (7). Control of canine rabies is highly cost-effective and even cost saving (6). However to adopt vaccination in low developing countries such as Uganda, we need to borrow the principle that was used but customize the process such that it can be effective in Uganda.

Policy implications

If the pets are not routinely vaccinated against rabies, more people are likely to die due to rabies arising from dog bites (as is already happening this year-2019). Annual vaccination of pets against rabies would minimize spillage of rabies to humans – thereby saving the cost of post exposure prophylaxis (PEP) in humans.

Policy recommendations

Adopting compulsory vaccination of pets for pet owners would reduce occurrences of spillage of rabies in humans in the country. This includes:- establishing the pet population, registration of pet owners, availability of subsidized rabies vaccines, establishment of pet vaccination centres for instance at sub-county headquarters, availability of trained officers to conduct pet vaccination and issuance of certificates, sensitization of the public about the significance of pet vaccination against rabies, and multi-sectoral collaboration for effective rabies control in the country.

Conclusions and recommendations

Rabies can be controlled in pets and prevent spillage to human population. The government of Uganda through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Ministry of Health (MOH), Uganda wild life Authority (UWA) needs to design and strengthen collaborative strategies that enable compulsory vaccination of pets against rabies to ensure elimination of human mediated rabies by 2030.

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POLICY BREIF

Improve availability and provision of quality postpartum care services at both facility and community levels to reduce occurrence of post-partum maternal and neonatal infections in Uganda

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Summary

Post-partum infections have been associated with severe maternal and newborn morbidity, death, and long-term disabilities. Prompt postpartum care services (PPC) for both the mother and the newborn is important in identifying and treating any complications that may arise from child birth, as well as to provide the mother with important information on caring for herself and her newborn. Postpartum care has remained relatively neglected in many interventions designed to improve maternal and neonatal health. Postnatal care coverage (% mothers) in Uganda is still low and was reported at 54.3 % in 2016, according to the World Bank collection of development indicators. According to the Uganda demographic health survey 2016 report, 54% of women reported to have received a postnatal check during the first 2 days after birth. The current government of Uganda policy regarding post- partum care services is for mothers to receive PPC when they bring their infants for immunization. However, this policy has not been implemented well and it is not clear how this policy has been adhered too. Although immunization use has continued to rise, it is noted that many mothers do not receive any post- partum care services even when they do bring their children for immunization. Also this policy does not include strategies to be implemented at community levels. Improving the availability and provision of quality postpartum care services at both facility and community levels can reduce occurrence of post-partum maternal and neonatal infections in Uganda.

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Background

Postpartum infections are the major causes of maternal preventable morbidity and mortality worldwide and also increases the length of patient hospitalization and hospital expenses(1). Post-partum infections usually occurs after the first 24 hours and within the first ten days following delivery(2). A large proportion of maternal and neonatal deaths occur during the first 48 hours after delivery. Thus, prompt postnatal care (PNC) for both the mother and the child is important to treat any complications that arise from the delivery, as well as to provide the mother with important information on caring for herself and her child (3).

Descriptive data analysis of a five-year period (2013 -2017), indicates that over the entire study period, 16,654 facility based new admissions due to maternal sepsis were reported in Uganda. The average incidence in maternal sepsis admissions over the five years was 34/10000 live births. The annual incidence increased gradually from 28/10000 live births in January 2013 to 50/10000 live births in December 2017. There was a 12% annual increase in admissions due to maternal sepsis from 2013 (2131 cases) to 2017 (5213 cases) (OR=1.12, 95%CI = 1.01 -1.24. The cumulative incidence in maternal sepsis admissions was highest in the northern region (199/10000 live births) and lowest in the central region (146/10000 live births).

Context and Importance of the Problem

Approximately five million cases of pregnancy-related infections occur every year globally, and approximately 75,000 result in death(3). Post-partum infections contribute 10% to the preventable maternal mortality in low-income countries(4). Apart from severe morbidity and death, women who experience post-partum infections are also prone to long-term disabilities such as chronic pelvic pain, fallopian tube blockage and secondary infertility(5). Maternal infections before or during childbirth are also associated with an estimated 1 million newborn deaths annually. Neonatal sepsis is often strictly connected to infection of the maternal genital tract during labour and maternal conditions after birth(6). In a retrospective study conducted to find out causes and predictors of maternal deaths at Mbarara regional referral hospital in Uganda, puerperal sepsis accounted for 31% of maternal deaths, making it the most common cause of maternal mortality at that facility. Around 1.5 million annual neonatal deaths occur in the first week of life(7).

Critique of Policy Options

Globally, the most common intervention for preventing morbidity and mortality related to maternal infection is the use of antibiotics for prophylaxis and treatment(8). However, the misuse of antibiotics for obstetric conditions and procedures that are thought to carry risks of maternal infection is common in clinical practice(9). Such inappropriate use of antibiotics among women giving birth has implications on global efforts to contain the emergence of resistant bacteria strains and, consequently, on global health. Therefore, appropriate guidance for health professionals and policy-makers on the need for antibiotics – and the type of antibiotics – for the prevention and treatment of maternal prepartum infections would align with the WHO strategy to reduce antibiotic resistance and, ultimately, improve maternal and newborn outcomes.

World Health Organization (WHO) recommends standard infection prevention and control measures that should be observed in the provision of maternity care to optimize the effects of interventions recommended in this guideline. These measures should include: Avoidance of infection by identifying and correcting predisposing factors to infection, clinical monitoring of women for signs of infection throughout labour and the postpartum period and early detection of infection by laboratory investigation as needed, reduction of nosocomial transmission of infections by barrier nursing of women with peripartum infections and care should be organized in a way that facilitates staff behavioral change and encourages compliance with the hospital infection control measures (10).

In Uganda, the availability and provision of quality post- partum care services at both facility and community levels is still poor. The government policy regarding post- partum care services is for mothers to receive PPC when they bring their infants for immunization. However, this policy has not been implemented well and it is not clear how this policy has been adhered too. Although immunization use has continued to rise, it is noted that many mothers do not receive any post- partum care services even when they do bring their children for immunization(10). The policy does not include strategies to be implemented at community levels. Therefore implementing strategies to improve availability and provision of quality post-partum care services at both facility and community levels can help in reducing the incidence of post-partum infections.

Policy recommendations

Increasing the availability and provision of quality postpartum services at facility and community level can reduce occurrence of postpartum infections. This includes the introduction of routine postpartum home visits, strengthening postpartum outreach services, integration of postpartum services for the mother in child immunisation clinics, distribution of postpartum care guidelines among health workers, upgrading postpartum care knowledge and skills through training and microbiological confirmation of infection or infectious outcomes.

Conclusion and Recommendations

Post-partum infections are preventable. The government of Uganda through the ministry of health needs to strengthen strategies that can improve the availability and provision of quality postpartum services at facility and community level to reduce occurrence of postpartum infections.

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washing facilities available for the children to use after using the toilet. These hand-washing facilities are situated just outside the classrooms.

Increase access to safe drinking water in Kampala slums to prevent future occurrence of cholera and other diarrheal disease outbreaks in the city

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Executive Summary

Kampala Capital City Authority (KCCA) with the Ministry of Health (MoH) battled a severe cholera outbreak from January to February 2019 that resulted in 3 deaths and affected 50 people in the five city divisions. The immediate response by KCCA and MoH was swift, and was instrumental in containing the outbreak. However, it is important that policymakers prioritize provision of safe water and improve sanitation coverage urgently to prevent future outbreaks in Kampala slums especially with the looming rain season.

This brief examines the epidemiology of the recent cholera outbreak in Kampala and provides recommendations to policymakers and implementers on what needs to be done to prevent future similar cholera outbreaks in Kampala.

The author suggests that the most recent outbreak should re-echo the need for the local government authorities to fully enforce the Public Health Act to prevent recurrent faecal contamination of water sources that are the root cause of the persistent cholera outbreaks in Kampala.

Introduction

Uganda is categorized by the World Health Organization (WHO) among the 51 "cholera endemic" countries; classified as those reporting confirmed cholera cases detected during the last 3 years with evidence of local transmission (1).

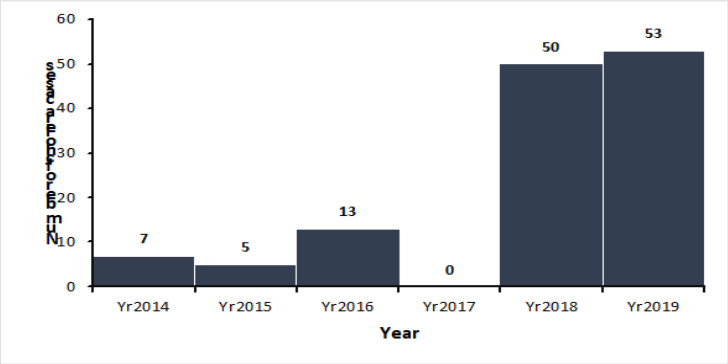

Figure 1: Chart showing reported cholera cases in Kampala for the period January 2014 to March 2019. Source: District Health Information System 2 (DHIS2)

Kampala city slums along with districts bordering Democratic Republic of Congo (DRC) and Karamoja region to the north east are the three cholera hotspots in Uganda(2). Cholera cases have been reported in Kampala city over the last six years with exception of 2017. (Figure 1). Kampala city, like most cities in developing countries, is experiencing rapid urbanization leading to an increase in population, and rapid development of peri-urban (informal) settlements. More than 60% of the city's population with low incomes reside in these settlements which have the lowest basic service levels (sanitation, water supply, solid waste collection, and storm water disposal) (3) ,(4). Most slums in Kampala are densely populated and situated in low-lying areas, making them susceptible to frequent flooding during heavy rains. Additionally, pit latrines are the dominant sanitary facilities used in these slums, resulting in constant risk of faecal contamination of shallow ground water, which is used as a drinking water source by a large number of slum dwellers (4,5). Even though construction of pit latrines along drainage channels and release of sewage into open drainages is a public nuisance according to the Uganda Public Health Act 2000, this has not deterred the practice especially in slum dwellings (6). This therefore, puts the slum dwellers at constant risk of cholera outbreaks whenever flooding occurs.

Cholera is an infectious disease with a short incubation period of a few hours to 5 days and has a high epidemic potential. It is transmitted through consumption of food, or water contaminated with cholera bacteria (7). It commonly presents with profuse painless watery diarrhea and vomiting and when untreated, about 5% of the cases die of severe dehydration (7).

In this policy brief, we examine the source of the recent cholera outbreak, mode of transmission, and recommend evidence-based interventions.

Approaches and Results

To be able to identify as many cases as possible, we used two strategies i.e. health facility and community case finding. The team visited health facilities and reviewed out patient, in-patient and laboratory records to identify current or previous patients that fulfilled the case definition. Patients who had been seen at a health facility and discharged were followed up and assessed. With the help of Village Health Teams (VHTs), the team also visited affected villages to identify more cases. We conducted a case control study matched by age using a ratio of 1 case: 5 controls. A case was any person with onset of profuse, painless acute watery diarrhea in a Kampala City resident (≥2 years) from 28 December 2018 to 11 February 2019. Controls were persons from the same village who never had any symptoms resembling cholera from December 28th 2018 to 11th February 2019. We assessed potential risk factors such as: source of drinking water, handling of water from collection to storage, water treatment practices and travel history to a place with cholera outbreak. We conducted an environmental assessment, and tested water samples from randomly selected households and water sources using culture and PCR to identify *V. cholera*.

We identified 50 people were affected, with 3 (6.0%) deaths. All age groups were affected; with age group 5-14 years being the most affected with attack rate (AR) (8.2/100,000). Cases were clustered in Sembule village, Lubaga Division which was the epicenter of this outbreak. We found that people who drank water from well X were 21 times more likely to develop cholera compared to those who took water from other sources (OR_{M-H}=21, 95% CI: 4.6–93). We also found that there was a 67% protective

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effect among residents who took water from the public token tap (OR_{M-H}=0.33, 95% CI: 0.13–0.86) and those who boiled water before drinking had an 85% protective effect against cholera (OR_{M-H} =0.15, 95% CI: 0.036-0.59). Of the 45 stool samples tested, 22 were confirmed positive for *V. cholerae* O1, serotype *Inaba;* a bacterium responsible for causing cholera outbreaks. The epidemic curve showed serious point-source outbreaks preceded by rains.

Sembule village had a token-operated water tap, which had broken down one month prior to the outbreak, and residents resorted to drink water from the open well. Environmental assessment showed that residents emptied their faeces into the drainage channel that was connected to the open well. Water from a container in one of 8 households tested positive for *V. cholerae*; water from open well had coliform counts ⍰900MPN/100ml.

Figure 2: Picture shows how water from well X could have been contaminated

Sembule village water systems

Sembule village, like most slums in Kampala is located in a swamp. The main sources of drinking water were: public token tap, private water tap and open well water. Residents accessed water from public token pipe at Uganda Shillings 38 per 20-liter jerry can. Sembule village had six public token taps; each token tap serving 20 households. It also had four open wells; two of which were free to the community. Meanwhile, a 20-liter jerry cost Uganda Shillings 300 for other two wells. Sembule village also had households with private taps that charged residents Uganda shillings 500 for a 20-liter jerry. We established that 87% (20/23) of cases accessed water from one public stand pipe. However, the tap broke down in December 2018; therefore, residents fetched water from other cheaper sources including from the free open wells. We observed that well X (implicated well) was in close proximity with a drainage channel that drained fecal matter from the latrines (Figure 2). The drainage channel flooded submerging the open well X. Community members waited for storm water to recede before collecting water. We found evidence of fecal matter released into the drainage channel from one of the pit latrines constructed along the drainage channel. We also observed that most of the community pit latrines were constructed along the drainage channel.

Conclusions

This outbreak was caused by drinking contaminated water from implicated well X. Break down of token tap forced members of the most affected households to resort to the cheaper alternative source of water that turned out to be heavily contaminated with faeces. We recommended emergency chlorination of drinking water, fixing the broken public tap, closure of well X, sensitization about the danger of drinking water from well X, and improving latrines so they are not discharged into the drainage channel.

Policy implications

Cholera outbreaks will continue occurring in Kampala slums if; coverage of safe water is not increased through increasing the number of cheap public token taps, Public Health Act is not fully enforced to ensure that all households have pit latrines and ensuring that no household discharges feces into the drainage channels.

Policy recommendations

Kampala Capital City Authority (KCCA) and National Water and Sewerage Corporation should increase access to affordable portable water in slum dwellings by increasing the number of public token taps. These water tokens should be accessible to every household to avoid exploitation by a few people in possession of water tokens. KCCA should ensure full enforcement of the Public Health Act for every landlord to provide sanitary facilities and ensure that feces are not released to the drainage channels during rainy days.

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